

# Integrating Organization Development and Six Sigma: Six Sigma as a Process Improvement Intervention in Action Research

Arthur B. Jeffery



Arthur B. Jeffery is a program manager for Comber Corporation in Orlando, Florida. He has a Ph.D. in Instructional Design, MBA, and MS in Systems Management. He has 15 years of university experience, teaching and publishing in the areas of quality management, quantitative methods, operations management, and employee training and development. Dr. Jeffery is also a retired Army officer with 20 years of command and staff experience, including Army-level training program evaluation and development.

## Contact Information

Arthur B. Jeffery  
Department of Management  
University of South Alabama  
Mobile, Alabama 36688

[ajeffery@camber.com](mailto:ajeffery@camber.com)

## Abstract

Organizations achieve success through the integrated functioning of people, processes, and technology. The strength of organization development lies in its roots in organization behavior and dynamics, and the application of action research to improve human performance and organizational effectiveness. The quality improvement method of Six Sigma offers advantages as a complement to use with other, less technical OD techniques when interventions are required to improve operational processes. By integrating Six Sigma into action research activities, OD practitioners can apply a more powerful set of tools to improve organizational effectiveness for their clients.



## Introduction

Organizations achieve results through a combination of people and processes supported by technology. The people aspect of organizations includes individuals, workgroups, and teams at all organizational levels. Processes in organizations possess both behavioral and operational dimensions. Technology is any tool people use to do their jobs.

The goal of organization development (OD) is the improvement of the effectiveness of the organization. To accomplish this goal, OD pursues opportunities for improvement using a total system approach, employing a wide variety of activities (Cummings & Worley, 2005). To improve individual and organizational effectiveness, all aspects of the organization are included in the effort, and the best and most appropriate tools should be used for improving the different aspects of the organiza-

tion. This article addresses the adaptation of a quality improvement procedure called Six Sigma that OD practitioners can include in their repertoire of analytic tools and interventions to support the analysis and improvement of organizational processes.

### Organization Development

Organization development (OD) is an integrated strategy of planned, systemic change employing behavioral science principles and practices and built on humanistic-democratic values to improve individual and organizational effectiveness, develop adaptiveness to changing environments, and improve the quality of work (French & Bell, 1999; Harvey & Brown, 1996; Robbins, 1995). Cummings and Worley define organizational development as "...a systemwide application and transfer of behavioral science knowledge to the planned development, improvement, and reinforcement of the strategies, structures, and processes that lead to organization effectiveness." (Cummings & Worley, 2005, p. 1). The organization development model includes: 1) planned change, 2) feedback-based collaboration, 3) an emphasis on performance improvement, 4) a humanistic imperative, 5) a systems perspective, and 6) reliance on the scientific method for organizational analysis (Harvey & Brown, 1996).

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### Six Sigma

Six Sigma is an operational process improvement strategy that focuses on improving process design

and reducing process error and waste (Harry & Schroeder, 2000). Organizations can employ the Six Sigma approach as a tool in a variety of organizational improvement methodologies or as a "stand alone" quality improvement program. General Electric and Motorola are the best known examples of using Six Sigma as a quality program. These programs focus on process analysis and improvement and the benefit such improvements can contribute to the organization as a whole. Although Six Sigma improvement protocols may identify needs to improve human performance and organizational dynamics, generally it is in the narrower context of directly impacting process improvement rather than systemwide improvements in organizational effectiveness, human behavior, or cultural change.

Six Sigma relies on planned change, team-based collaboration, a focus on performance improvement, a systems perspective, and reliance on the scientific method and statistical methodologies. The analytic focus of Six Sigma can be complementary to the principle emphasis of OD in improving organizational effectiveness through organizational behavior and dynamics, i.e., the people side. The application of Six Sigma methods can improve those operational processes that are recurring, observable, and measurable. OD practitioners often find themselves analyzing operational processes in addition to human behavior processes when attempting to help organizations create solutions to problems or discover opportunities for improvement.

### Action Research

The analytic "engine" in OD used to determine the nature of existing problems or opportunities for improvement is the action research model (French & Bell, 1999). Action research is an approach credited to Kurt Lewin and others that advocates collaborative action planning and implementation

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based on feedback from data collection and research to make the organization and its members more effective (French & Bell, 1999; Harvey & Brown, 1996). This model has evolved for the purpose of analyzing organizational problems related primarily to organizational behavior. Organization development embraces a comprehensive diagnostic scheme that includes the organizational, group and individual level, and seeks to develop interventions designed to improve organizational performance and effectiveness. Techno-structural interventions focus on structures, processes, and technology (Cummings & Worley, 2005). Technostructural interventions are where OD practitioners can employ Six Sigma techniques. This is especially true when the discovery of problems or opportunities involves analyzing recurring behaviors or performance, or process design.

### A Missing Link Between OD and Six Sigma

A recent keyword search of the literature revealed, as expected, an abundance of articles concerning organization development, Six Sigma, and action research. However, refining the search to identify the combination of the keywords "organizational development" and "Six Sigma" yielded only 4 "hits," and no hits for the combination of "action research" and "Six Sigma." The most recent major OD text makes little mention of Six Sigma and offers little insight into how the OD practitioner might employ Six Sigma as an OD tool (Cummings & Worley, 2005). Since Six Sigma is most often associated with the domain of quality management, the link between OD and Six Sigma can be established indirectly through this discipline. The application of quality analysis and improvement is documented in the OD literature, exemplified by the works of Lindsey and Petrick (1997), *Total quality and organization development*, and Dan Ciampa (1991), *Total quality*, which underscore the logical link between the philosophies and objectives of OD and total quality (par-

ticularly the concept of continuous improvement). Additionally, the advent of the Malcolm Baldrige Quality Award has created requirements for the demonstration of organizational analysis and change interventions in the context of quality management (Ford & Evans, 2001).

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Nevertheless, the application of Six Sigma as a process improvement methodology within the context of OD efforts is not evident in the literature. This article examines the potential of using Six Sigma to support action research when process improvement is indicated and process performance is recurring, observable, and measurable. Additionally, this article offers an argument for the inherent compatibility of OD and Six Sigma. Finally, it presents an approach to employing Six Sigma to support OD interventions prescribed for process improvement.

## Action Research

### Role of Action Research

Action research is a data-driven, problem-solving method based on the principles of scientific inquiry. It is used to learn about the organization in order to implement change designed to improve the organization (French & Bell, 1999).

Traditionally, action research relies heavily on survey data and feedback processes because these are good sources for the affective domain (Cummings & Worley, 2005). Such emphasis on survey infor-

mation does not preclude the use of other sources of data, and the literature indeed supports a variety of techniques for collecting and analyzing data from many sources as part of the action research process.

As outlined by French and Bell (1999), action research consists of: 1) Preliminary diagnosis, 2) data gathering, 3) data feedback, 4) data exploration, 5) action planning, 6) action implementation, and 7) evaluation and assessment of the results. An important characteristic in action research is the involvement and collaborative client-consultant effort in all aspects of the action research process and team-building.

A diagnostic model described by Cummings and Worley (2005), based on a data-based model offered by Nadler (1977) consists of: 1) data collection planning, 2) data collection, 3) data analysis, 4) feedback, and 5) follow-up.

Both of these models follow the basic problem-solving paradigm evolved from the scientific method and systems analysis. It is not surprising, then, that the scientific method and systems analysis are also the basis for quality improvement model and Six Sigma.

### Opportunities for Six Sigma in Action Research

OD practitioners use many diagnostic models to identify problems within organizations. As problems or opportunities for improvement are revealed, the OD practitioner formulates and applies the most appropriate interventions. When problems or opportunities lie in systematic, recurring processes, Six Sigma may be the most effective tool to support the intervention.

Six Sigma focuses on process improvement through reducing sources and motivation for error

discovered through the structured application of statistically-based analytic tools. Six Sigma, when applied as an action research tool, provides the OD practitioner a powerful process-based systematic and analytic methodology that determines causes and the extent of error that diminishes performance.

Human performance, both individual and collective, is often measurable. OD practitioners may find themselves evaluating measures of productivity, error rates, absenteeism, training performance results or other assessments in search of clues to lapses in organizational performance or opportunities for improvement. The Six Sigma approach uses process variation as a key indicator of poor performance, an opportunity for improvement (when variation is diminishing), or as evidence for further examination or analysis.

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Variation in human performance is a product of human behavior, organizational dynamics, process design, or some combination of all these factors. When the goal is to reduce variation in human-based performance, OD practitioners can employ process analysis models such as Six Sigma to identify process-related problems and then develop process interventions and integrate these interventions into the overall OD effort.

Regardless of the focus of inquiry, since human-based performance is measurable and these meas-

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ures are identified through action research, then errors in interpreting the data can best be avoided by using analytic techniques employed by Six Sigma. Clearly, there is a need for both quantitative and qualitative analytic techniques in solving organizational problems or discovering opportunities for improvement through action research.

### Six Sigma

#### The Stigma of Six Sigma

Many measures of human and organizational performance are quantifiable and should be analyzed in a manner to preclude reaching inappropriate conclusions based on misinterpretation of the data. This need has brought Six Sigma into the service sector (Smith, 2003), and has facilitated the application of Six Sigma techniques to human performance improvement efforts (Pande, Neuman, & Cavanagh, 2002; Summers, 2000).

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Six Sigma has its origins in quality improvement in technical manufacturing processes. Based on the association of Six Sigma with manufacturing processes and statistical analysis ("Six Sigma" after all, is named after a statistical principle that indicates a process capability of one error in 3.4 million), the stigma of Six Sigma is that in many organizations Six Sigma is associated more with technical quality improvement efforts rather than on a context of an OD tool to help improve human

and organizational performance (Summers, 2002). However, Six Sigma has emerged as a metaphor for the way managers focus on achieving excellence in all aspects of the organization in highly competitive environments (Yilmaz & Chatterjee, 2000).

#### The Role of Six Sigma

Six Sigma is a systematic breakthrough management strategy designed to reduce process error and improve the bottom line (Harry & Schroeder, 2000). These goals are common objectives of organizations embarking on OD efforts. Like diagnostic efforts in OD, Six Sigma can be applied to any level of human endeavor from individual to large organizations as long as the performance is recurring, observable, and measurable.

Six Sigma is a structured analytic model with the purpose of improving performance through the reduction of process variation. The Six Sigma approach employs the paradigm of DMAIC- (define, measure, analyze, improve, and control). When applied, these steps include: 1) recognizing and defining the problem or opportunity for improvement, 2) measuring and analyzing performance, 3) developing and implementing interventions for improvement, and 4) controlling the improvements to make sure the improvements are sustained through standardization and integration into the organization's procedures (Harry & Schroeder, 2000). These steps can be easily integrated into the OD process steps and support the argument of compatibility between OD and Six Sigma.

Like OD and any other effective process improvement effort, Six Sigma is team-oriented. Based on the research conducted by Cooper and Noonan (2003), success in Six Sigma efforts relies heavily on effective teamwork. When employed as an independent organizational program, Six Sigma

traditionally employs the use of a cadre of people within the organization trained in organizing Six Sigma teams and utilizing Six Sigma techniques. These individuals are referred to as either "black belts" (designated leaders and supervisors of Six Sigma performance improvement teams) or "green belts" (team members and operators within the organization trained to use Six Sigma tools and support Six Sigma efforts) (Lucas, 2002).

Although formal training and certification are not a prerequisite for the application of Six Sigma procedures in an OD effort, the availability of such training and certification represents an added dimension and potential advantage to the OD effort.

### What Six Sigma Has to Offer OD

Six Sigma is best suited for analyzing and improving process design in order to reduce variation because variation in human-based performance is usually random (i.e., the nature of the next variation cannot be predicted). The pattern of outcomes will likely conform to either Normal or Poisson probability distributions. This lays the groundwork for a wide range of analytic techniques that help the analyst determine how much variation is present and whether or not the variation is sufficient to negatively impact performance (Goetsch & Davis, 2000).

If used to support action research, Six Sigma offers several analytic dimensions that would serve to significantly strengthen the traditional action research model. These dimensions include 1) a variation reduction approach, 2) a longitudinal rather than "snapshot" data collection approach, 3) an integrated evaluation for financial impact, 4) opportunities for the client to train and certify internal Six Sigma consultants, and 5) a support system for other OD methods because it is team-based and focused on long-term improvements. This provides the potential to smoothly integrate Six Sigma into OD processes and expand the capa-

bility of the performance improvement effort.

**Variation Reduction.** Often OD efforts focus on improving consistency in human performance. The Six Sigma approach can help improve organization performance by identifying opportunities to reduce variation in human output. Communication ineffectiveness, procedural errors, and training shortfalls are all examples of sources of performance variation or inconsistency. Variation in human processes can be measured, analyzed for effects on performance, and reduced through the implementation of interventions designed to improve consistency.

Variation is present in all processes and activities. However, not all variation is problematic. Six Sigma measures performance over time and establishes performance parameters through the use of statistical process control charts or run analysis. This allows the OD consultant to make a statistically-based determination if the amount of variation is causing a problem or not. If the level of inconsistency is excessive, then cause and effect diagrams or other problem-solving approaches can be used to determine the factors that contribute to the unacceptable variation. This sets the stage for the development of interventions that should ultimately reduce the variation to acceptable levels.

Another Six Sigma analytic tool related to variation is a measure that indicates if variation is within the intended range of the process or activity (Gyrna, 2001), known as process capability. A measure of process capability called the process capability ratio (Cp) assists the OD analyst to track performance over time. If the process capability index increases over time, performance tends to improve.

**Longitudinal versus "Snapshot" Perspective.** Six Sigma focuses on performance over time.

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Historical process data are used to measure past performance, identify performance patterns, and create a benchmark for performance improvement (Gyrna, 2001). OD analysts can continue to collect process measures in order to evaluate the effects of interventions. This provides an opportunity for analysts to compare measures of past and on-going performance with data collected from surveys and interviews ("snapshot" data) to triangulate multi-variate data in order to create an accurate picture of performance and performance problems.

**Evaluation of Financial Impact.** A key element of Six Sigma is the determination of the cost of performance shortfalls and the financial impact of performance improvement (Harry & Schroeder, 2000; Lucas, 2002). This information is used to prioritize improvement efforts based on what improvements will yield the greatest payoff in terms of financial and organizational effectiveness. This aspect of Six Sigma adds an important value-added dimension to OD.

**Internal OD/Six Sigma Specialists.** OD consultants cannot always remain as long-term consultants for their clients, and internal OD consultants often do not have sufficient resources at their disposal to maintain the level of analytic intensity required to sustain long-term interventions. The creation of permanent OD/Six Sigma teams to guide performance improvement efforts is a critical aspect of achieving long-term goals. There is an abundance of opportunities for training people in Six Sigma techniques. In OD projects, where a more intensive Six Sigma effort would be beneficial, the OD consultant could recommend that the client create a more formal Six Sigma infrastructure. In this situation, selected organization members would receive training as black belts and green belts and develop the skills to build and lead Six Sigma teams.

**Compatibility with OD Methods.** Organization development embraces a concern with transfer of knowledge and skill that enables evolutionary improvement and change (Cummings & Worley, 2005). This perspective is consistent with Six Sigma's focus on long-term, continuous performance improvement and reliance on intelligent innovation and adaptation (Harry & Schroeder, 2000). In Six Sigma, the whole purpose of the endeavor is to discover better ways of implementing processes and create active control measures that should sustain performance improvements. Both philosophies embrace a cyclical continuous improvement process where efforts to improve performance restart as soon as one round of improvement is implemented and stabilized.

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Also, like OD, Six Sigma techniques stress team building and team approaches to improving performance. In Six Sigma, a great deal of attention is paid to organizing cross-functional performance improvement teams, developing team leaders, and creating effective communication and collaboration within teams (Pande, Neuman, & Cavanagh, 2002). The team approach of Six Sigma underscores the natural fit of Six Sigma as a powerful OD tool.

## Integrating Six Sigma With Action Research

There are several imperatives for employing Six Sigma as an OD tool. These include 1) acquiring a skill set for the application of Six Sigma, 2) developing, within the framework of action research, a focus on measuring and analyzing process variation, 3) clearly portraying variation and inconsistency in a way that is easy to communicate and understand, 4) creating innovative ways to map causes for problem or opportunities for improvement, 5) reducing error and inconsistency, and 6) identifying the reduction of error and inconsistency as an OD goal.

**Six Sigma Skills.** The first and most obvious step is for the practitioner to gain a comfortable understanding of the Six Sigma approach. The beauty of Six Sigma is that it is multidimensional and offers something for everyone. The Six Sigma methodology can be tailored to a situation or environment at a level comfortable to the user. It does not have to be a large-scale, time-consuming, and heavily quantitative or complex endeavor. There are many excellent books and articles on Six Sigma that range from the "for dummies" level to the highly technical. Mikal Harry's seminal 1999 book, *Six Sigma*, is a straightforward management book that clearly explains the Six Sigma philosophy and method. This book is an "easy read" even for "stat-phobics." The wide range of choices makes it easy for anyone to develop an understanding of the Six Sigma approach and over time develop advanced Six Sigma skills.

**Focusing on Measuring and Analyzing Process Variation.** A second imperative is to develop a process orientation that focuses on measuring and analyzing process variation. This requires the analyst to develop a stronger awareness of the process

side of organizational dynamics. OD practitioners need to identify and map processes using flowcharts or similar graphic techniques. Once the process is mapped-out, recurring, observable outcomes can be identified for sampling, measurement, and analysis.

### Identifying and Portraying Process Variation.

The results of the process analysis need to be organized in a manner that is easily communicated and understood. Process control charts, tables, and charts can be constructed to facilitate visual analysis. Clear visual displays make identifying problematic variation easy.

**Exploring Problem Causes and Opportunities for Success.** Once problematic process variation has been identified, a cause-and-effect analysis should be conducted to determine root causes of problems or target opportunities for improvement. Techniques such as cause-and-effect diagrams, current reality trees, and concept mapping facilitates what needs to be fixed or established as a best practice.

**Reducing Error and Inconsistency.** The creation and implementation of improvement interventions are the heart and soul of OD and Six Sigma. Interventions for process-based problems involve changing the design to reduce inconsistency and error. It is here that the power of effective change agency makes things happen, and it is here that OD and Six Sigma become synergistic in many respects. The successful implementation of process improvement interventions relies on adaptability to change. When changes are embraced (usually supported by positive results for both the people side and the bottom line), long-term improvements should follow.



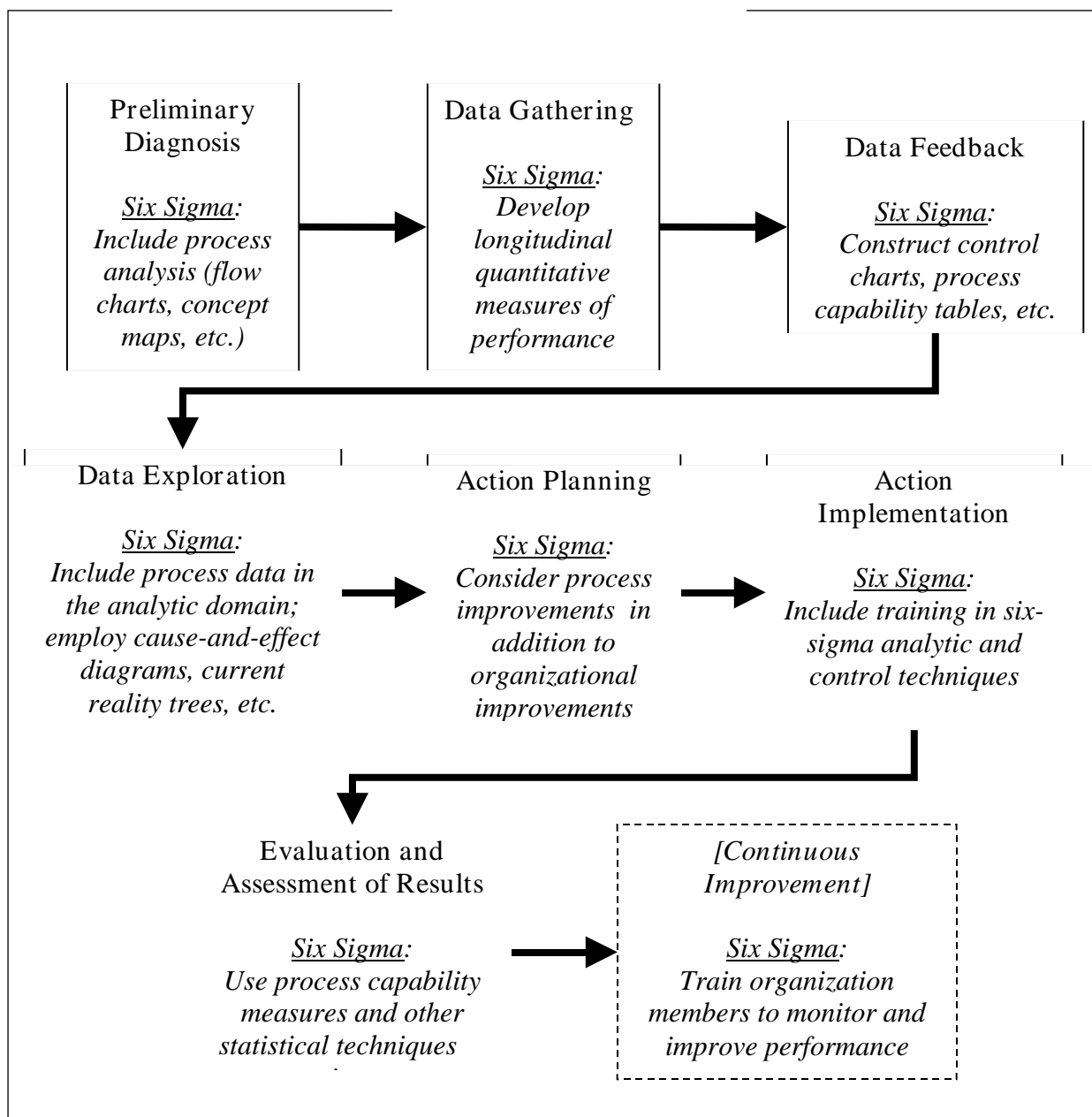


Figure 1. OD/Six Sigma integration.

Reducing Error and Inconsistency as an OD Goal. This last imperative may appear obvious but it is not. The reduction of process errors and inconsistency must be one of the stated goals of the OD process. Any benefits derived from Six Sigma methods may not be effective or long-term, unless these are an integral part of the OD process. For this reason, Six Sigma must be integrated up front as part of the action research model and not as a separate endeavor.

Figure 1 presents a schematic framework for considering and integrating Six Sigma techniques into the traditional OD action research model. The model described by French and Bell (1999) serves as the OD foundation. The italicized text represents the specific Six Sigma directives within the OD process. Note that "continuous improvement" is offered as an eighth step to the OD model.

## An Example of Six Sigma Integration

An urban hospital handles cases for a large HMO. The hospital has been receiving a large number of complaints from patients, the care providers, and the HMO about delays and errors in processing approval requests for diagnostic and treatment procedures and claims. Morale in the insurance processing section is low and frustration levels high. Management has engaged an OD specialist to try to identify and recommend interventions to improve performance and organizational efficiency. After three months, the OD team identifies numerous problem areas. The three most significant problems are a lack of confidence on the part of management in the capability of the case agents handling the diagnostic procedures requests and insurance claims, the case agents' frustration with ever changing HMO procedures, and the care providers' lack of knowledge in proper procedures. Interventions that are implemented show promise in diminishing these problems and improving organizational efficiency.

However, one area that continues to be problematic is inconsistent processing times for care requests and claims. The OD team decides to examine feedback from interviews, survey data, and direct observations of the request and claim process. The team concludes that in spite of the uniqueness of each case, the process and information requirements are essentially the same, with only the information being different. The problem appears to be the lack of consistency on the form wherein the information is reported, and the time frame the information is received. The OD team elects to apply the Six Sigma approach since the process is repetitive and the process events are measurable (information delivery times, processing time, and error rates). Furthermore, Six Sigma appeals to the

team because it is an established, integrated procedure rather than a disparate collection of process analysis and improvement techniques.

Following the DMAIC process, the OD team defines the problem as inefficiencies in the information flow. The team maps the process using flow charting techniques and then identifies information needs on how patient information is created and processed, the extent of data format standardization, information processing time at different stages of the process, and error sources. Next, the team develops data collection and performance measures for each examined element, such as checklists for information content, time records, and error reports. The team measures, collects and charts performance data. Errors are type classified and the team works through a cause and effect diagram to identify sources of error.

At this point, the OD team analyzes the data and information developed so far. Simpler, better structured information formats, and streamline and "error proof" procedures are then designed. The team implements the improvements and monitors the results. Next, the team establishes process controls by developing control charts to determine thresholds for acceptable processing times and error rates. The team creates a registry to monitor and evaluate follow-on improvements. Finally, the team evaluates the impact of the improvements on the other OD interventions to determine if the changes contribute to improvements in overall efficiency, morale, and confidence.

Although the techniques employed by the OD team are common quality improvement and re-engineering approaches, the integrated nature of the DMAIC process guides the team to the optimal combination of process interventions.

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## CONCLUSION

As an OD tool, Six Sigma is best suited in the diagnosis and improvement of processes. OD practitioners can implement Six Sigma to perform more technical analyses of processes to support technos-structural interventions. When Six Sigma is integrated with other OD techniques, the combination constitutes a formidable expanded performance model that offers a wider range of diagnostic and improvement capabilities, potentially reduces improvement cycle time, and clearly impacts the bottom line. Client organizations should easily recognize the value of these enhancements and seek out practitioners who can integrate Six Sigma as a valid OD intervention for process analysis and improvement.

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